

Analysis of Noise Exposure Measurements Made Onboard the International Space Station

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Abstract

The International Space Station (ISS) is a unique workplace environment for U.S. astronauts and Russian cosmonauts to conduct research and live for a period of six months or more. Noise has been an enduring environmental physical hazard that has been a challenge for the U.S. space program since before the Apollo era. Noise exposure in ISS poses significant risks to the crewmembers, such as; hearing loss (temporary or permanent), possible disruptions of crew sleep, interference with speech intelligibility and communication, possible interference with crew task performance, and possible reduction in alarm audibility. Acoustic measurements are made aboard ISS and compared to requirements in order to assess the acoustic environment to which the crewmembers are exposed. The purpose of this paper is to describe in detail the noise exposure monitoring program as well as an assessment of the acoustic dosimeter data collected to date. The hardware currently being used for monitoring the noise exposure onboard ISS will be discussed. Acoustic data onboard ISS has been collected since the beginning of ISS (Increment 1, November 2000). Noise exposure data analysis will include acoustic dosimetry logged data from crew-worn during work and sleep periods and also fixed-location measurements from Increment 1 to present day. Noise exposure levels (8-, 16- and 24-hr), L_{EQ} , will also be provided and discussed in this paper. Discussions related to hearing protection will also be included. Future directions and recommendations for the noise exposure monitoring program will be highlighted. This acoustic data is used to ensure a safe and healthy working and living environment for the crewmembers aboard the ISS.

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